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nearly identical with those of the vitellus. After undergoing successive transformations into three larval forms the adult insect finally issues from the puparium of its host, only one adult finally making its appearance from an individual puparium, although in the cyclops stage four larvæ may be present. There seems, in this first stage, to be a physiological competition between *Trichacis* larvæ, only the oldest surviving to take on its second stage. An interesting point is that there appear to be definite molts from the first to the second and from the second to the third stage, and that the dead bodies of the cyclops larvæ which succumb do not interfere with the development of the survivor.

Careful observations have also been made with an allied parasite, *Polygnotus minutus*. The larvæ of this species, instead of being localized in the nervous system, as are those of the *Trichacis*, are found in the gastric sac, where there are found a number of 10 or 12 grouped together, developing simultaneously, and all, or nearly all, destined to reach the adult condition. The group of young larvæ forms a mass situated in the interior of the stomach. It is surrounded by a hyaline and, perhaps, adventitious membrane. Each parasitic embryo is also surrounded by a membrane of its own. The larva is elliptical, somewhat attenuated at its posterior extremity, and provided with rather well developed mandibles. They fill the gastric cavity, which is generally distended. The second and third larval forms follow. The host is almost entirely devoured and reduced to a cutaneous sac. When ready for pupation they occupy the entire body cavity of the host, the skin being distended and showing by impressions the positions occupied by the contained parasites, thus appearing full of minute cocoons.

It is strange that a field of such great biologic interest as the development of these insect parasites has been neglected to a striking extent. The difficulties which once surrounded the technique of such studies have been brushed away by the discoveries of modern morphologists, and a great field is open to the first well equipped worker who cares to enter it.

L. O. HOWARD.

L'Année psychologique, 3me Année. Publiée par M. ALFRED BINET. Paris, Alcan. 1897. Pp. 825.

The three years of this annual have now made for it an established place among psychological journals, and furnish gratifying evidence of the introduction in France of sound laboratory methods in dealing with all phases of mental activity. M. Binet has established at the Sorbonne a laboratory where the abnormal and the startling, so closely associated with French psychological research, do not constitute the main field for investigation, but where problems more nearly approaching those of most other psychological laboratories awaken chief interest and receive valuable contributions toward their solution. The present number confines its original contributions, of which a brief analysis is given below, more strictly than before to the announcement of results of research at the Sorbonne, and gains thereby a decided advantage in reduction in size. One of the main interests of this laboratory at present is evidently the problem of the relation of blood-circulation to mental process. Its discussion occupies more than half the pages devoted to original matter. The problem is one of large importance to psychology, and it is being materially advanced, both as to method and as to established facts, by such work as is here reported. In addition to its original articles the *Année* contains as usual careful analyses of the psychological literature of the year (pp. 335-688), and the bibliographical index of *The Psychological Review*.

(1) *L'abstraction des émotions* (Pp. 1-9): TH. RIBOT. Abstract emotions can exist to a very limited extent. They are formed by the combination of characteristics common to various particular emotions, without losing wholly their true affective tone. Such terms as: 'spirit' of a country, of a place, of an opera, etc.; 'moral environment,' and 'moral atmosphere,' express such a condensation of emotions. Other examples are found in certain æsthetic works, especially those of the symbolists.

(2) *Les changements de forme du pouls capillaire aux différentes heures de la journée* (Pp. 10-29): BINET and COURTIER. Many variations exist in the form of the capillary pulse in dif-

ferent individuals and under different conditions. But one fact remains constant: Under the influence of a meal there occurs an acceleration of the heart, an augmentation in the amplitude of pulsation, and a lower position of the dicrotism. As the hour of the meal grows more distant the heart works more slowly, the amplitude of pulsation decreases, the dicrotism mounts toward the summit of the pulsation and tends to diminish or disappear. These phenomena are not due to the changed temperature of the hand alone, and are seen in the pulse of the wrist and of the carotids, as well as of the capillaries. They are doubtless intimately related to the sense of well-being, expansion and force which follows a moderate repast.

(3) *Les effets du travail musculaire sur la circulation capillaire* (Pp. 30-41): BINET and COURTIER. Local and fatiguing muscular exercise produces a weakening of the dicrotism, a blunting of the point of the pulsation, a tendency toward displacement of the dicrotism toward the point. General and moderate muscular exercise lowers and accentuates the dicrotism and sharpens the point of pulsation. General and fatiguing exercise weakens the dicrotism without displacing it toward the summit.

(4) *Effets du travail intellectuel sur la circulation capillaire* (Pp. 42-64): BINET and COURTIER. Short and energetic intellectual effort produces an excitation of the functions, vaso-constriction, acceleration of the heart and respiration, followed by a slight slackening of these functions; also in certain subjects, weakening of the dicrotism. Intellectual work lasting several hours with relative immobility of the body diminishes the heart's rapidity and the peripheral capillary circulation.

(5) *Influence de la vie émotionnelle sur le cœur, la respiration et la circulation capillaire* (Pp. 65-126.): BINET and COURTIER. In most persons every emotion produces a vaso-constriction, an acceleration of heart and respiration, and an increase in amplitude of the chest; and the more intense the emotion, the more marked are these effects. In a few rare cases a sensation of pain and an emotion of sadness very slightly lessened the rapidity of the heart. It is possible, as was shown by observation of one subject es-

pecially, that the form of the capillary pulse changes with the *quality* of the emotions—a fact which may some time make possible a classification of emotions according to their physiological effects upon the form of the pulse.

(6) *Influence du travail intellectuel, des émotions et du travail physique sur la pression du sang* (Pp. 127-183): BINET and VASCHIDE. An improved form of the sphygmomanometer of Mosso was used to indicate the relative, though it did not give the absolute, measure of the blood pressure. This was found to increase under the influence of all the excitations mentioned above. The most intense effect was produced by physical work; spontaneous emotions came next, and the least intense effect was given by intellectual work. As the capillary pulse seemed to be intimately related to the quality of emotions, so the pressure of blood may prove to furnish a measure of the quantity (or intensity) of mental phenomena.

(7) *Enquête sur les premiers souvenirs de l'enfance* (Pp. 184-198): V. and C. HENRI. A series of questions was published in various reviews in 1895, to which 123 answers have been received. The first memory may be of an event occurring as early as the age of six months, or as late as eight years; the large majority correspond to the age of two to four. Other interesting details are given, and a further pursuit of the enquiry is promised.

(8) *Sur la localization des souvenirs. La localization dans les expériences sur la mémoire immédiate des mots* (Pp. 199-224): N. VASCHIDE. Series of words were read, 8 to 20 in number, and the subject was required to indicate the position of each word in the series. The main results were these: (1) There is not one single method of localization, but several differing greatly from one another. (2) These methods do not all of them depend essentially upon the memory; some depend on reasoning; and in many cases, where the localization is made by memory, reasoning directs or controls the task. (3) The localization is not made always, as has been supposed, by association, or, in other words, by reference to certain 'points de repère.' That is only one form, the mediate form. Some localizations are direct, immediate.

(9) *Nouvelles recherches sur la localization des sensations tactiles. L'expérience d'Aristote* (Pp. 225-231): V. HENRI. If two fingers are crossed and their ends touched by the two points of a compass, then the further removed from one another the two points actually touched, the nearer they will seem; and the point actually to the left will seem to the subject to be toward the right, and *vice versa*. If in this position of the fingers a single point of one finger be touched, it will be mistaken for the corresponding point of the other finger. Previous theories of tactile localization cannot explain these facts, and a discussion of their explanation is reserved for a later paper.

(10) *Étude sur le travail psychique et physique* (Pp. 232-278): V. HENRI. This paper is a contribution to the study of 'individual psychology.' Two factors enter into all work, whether mental or physical: *voluntary effort*, for the measure of which no sufficient test yet exists; and *attention*. The following tests are suggested for the study of the constancy and variations of the latter: (1) a series of discriminative reactions; (2) mental calculations, multiplication being preferable to addition; (3) writing to dictation as rapidly as possible; (4) learning by heart series of twelve numerals, and noting the number of repetitions necessary, and the number learned after each five minutes. Each of these tests shows results differing greatly with different individuals. Beside these general factors other special factors enter into particular kinds of work. Physical work depends especially upon *motor ability* or *skill*, for whose testing no thoroughly good test has been suggested, and *muscular power*, best studied by determining the manner in which an individual becomes fatigued. For this purpose Kräpelin's modification of Mosso's ergograph is well suited. For methods of determining the factors entering into mental work Henri refers to the article published by him and Binet in the previous review. He further shows the importance to pedagogy of these researches on mental and physical work, and finally presents, with some detail, the results attained by previous investigators in this field, and gives a bibliography of the subject.

(11) *Réflexions sur le paradoxe de Diderot*

(Pp. 279-295): A. BINET. Diderot claimed that a great actor does not experience the emotions that he depicts, and supported this contention by several arguments. Binet questioned nine actors in regard to this, and all replied unanimously that an actor always feels more or less the emotions of his character. Binet analyzes this artistic emotion and also the complex state of consciousness, at once emotional and critical, of both actor and spectator.

(12) *Psychologie individuelle—La description d'un objet* (Pp. 296-332): A. BINET. Binet here again insists upon the importance of the study of the higher mental processes as a means for making advance in individual psychology, and describes in detail one such test. In studying younger children he had them give a description, from direct observation or from memory, of a photograph presenting a number of details. He notes the length of the descriptions, the amount of simplification (an average of only two-fifths of the objects presented in the photograph were described, and in passing from perception to memory one-third of the objects were forgotten), the kind of objects selected for description and the associations with the memory of the fable of which the photograph was a representation. He compares children of different ages, and finds that he can divide the individual children into four types, as follows: (1) the descriptive type, describing only objects, and especially their prominent characteristics, without attempting to seize their significance; (2) the observing type, fixing their attention especially on the subject of the scene, judging and interpreting what is perceived; (3) the emotional type, attaching emotional terms to the objects described (but this type is not necessarily emotional in ordinary life); and (4) the erudite type, who, in place of describing the picture, express their knowledge of its subject.

Binet applied the test also to older persons, placing before them, as object for description, a cigarette. He finds here also four types, identical with the above, with the exception that the emotional type does not appear; and a fifth is described: the idealistic, imaginative and poetic.

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